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Philosophical Transactions. N^o. 202.

Fig: 1.

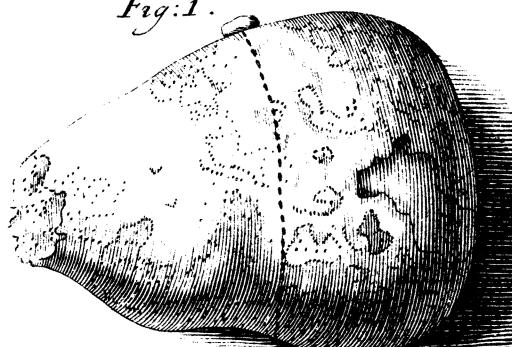


Fig: 2.

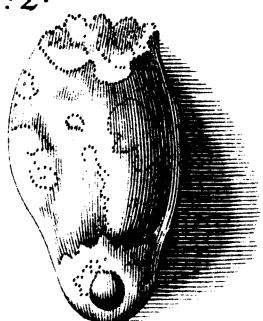


Fig: 3.

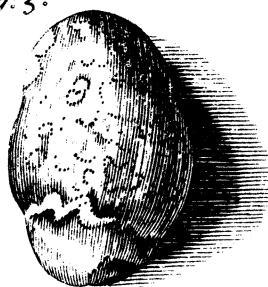


Fig: 1.

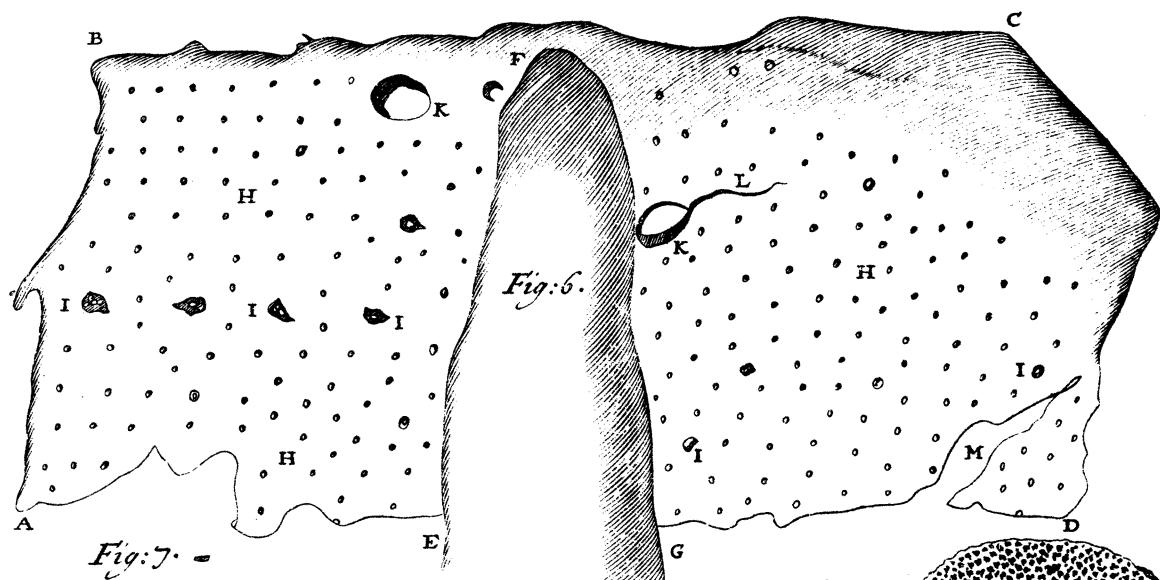


Fig: 7.

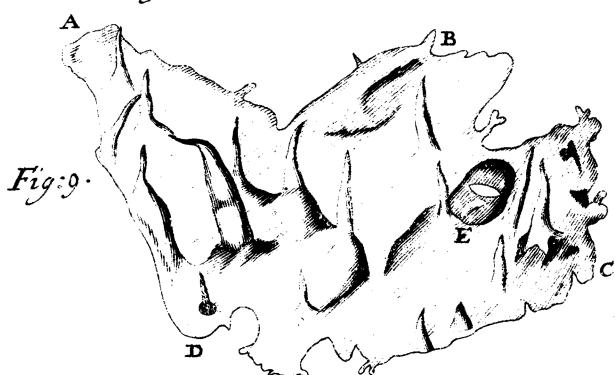


Fig: 8.

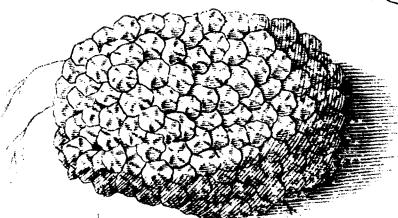
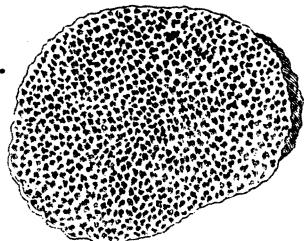


Fig: 5.



To conclude, there is not a Corner in all the Valley of *Noto* that is not ruined wholly, or for the most part, with a dreadful Slaughter of the People. The Southern Coasts, as *Licati*, *Terra Nova* and *Gircuti* have suffered Damage in their Buildings. And all the Castles of the Valley of *Emone* near *Mongibello* are crack'd and broken, or fallen down.

This is the Tragedy of *Sicilia*. His Excellency Seignior *Viceré* has given prudent and necessary Orders from *Palermo* for the Relief of the afflicted and miserable Remains of an amazed and half-dead People.

VIII. An Extract of a Letter from Mr. Anth.

Van. Leeuwenhoek, containing several Observations on the Texture of the Bones of Animals compared with that of Wood : On the Bark of Trees : On the little Scales found on the Cuticula, &c.

I Some years since writ Mr. *Oldenburgh*, That I conceived the Bone to be constituted of Globules ; but finding my Mistake, I retracted that Opinion : For what I then took for Globules, was the tops of the Tubes or Cilinders whereof the Bone is composed.

Not satisfied with my Observations thereon, I continued my Endeavours to discover the true Texture of Bones ; and at length found plainly in the Thigh Bone of an Ox, that it consisted of four sorts or sizes of Tubes, whereof some are so very small and close united, as not easily to be discerned in a Bone cut a-cross, though with

with an extraordinary sharp Knife, nothing but Globules appearing : But when it is broken, some Shivers are separated, in which these *Tubuli* may be seen.

Another sort of these *Tubuli* (of which some are six times bigger than the other) are yet hard to be discovered ; for though the Knife be very sharp, yet by reason of the hardness of the Bone many Particles of them are broken and squeezed together, so as the Mouths of the little Tubes are closed up.

A Third sort much larger than the former, had nevertheless their Mouths scarce discoverable ; but I found them placed in such an Order, as convinced me, that the Ring of these *Tubuli* was the Augmentation of the Bone, as I had formerly discover'd it to be in Wood, especially when I saw, at a little distance, another Circle or Ring of *Tubuli*.

A Fourth sort exceeded the former very much, and were fewer ; so that in the space of three or four Sands I did scarce find one of them.

I have represented as well as was possible a small bit of an Oxes Thigh Bone, as it shew'd before my Glasses, *Fig. 6. ABCD*; the bit by the naked Eye was not bigger than the little Spot, *Fig. 7. E FG* is the Point of a small Needle on which the bit of Bone was stuck. I could not observe the first and least sort of *Tubuli* in this little bit ; for when the Bone is thus cut, the ends of the small Tubes are but confusedly to be seen, like irregular Globules. But the second sort look like little dark Specks, their Cavities being stopt, by cutting which are scarce to be discerned, especially if the Knife does not cut them at very true right Angles ; for if it be ever so little aslope, it is impossible to discover these Vessels. They are represented Letter *HHH*.

The third sort of *Tubuli* are shewn by Letter *III*, and there I found not only placed in Circles orderly, but likewise in a different manner, as the large Vessels are in Wood.

The fourth sort of Tubes large, in comparison of the rest, are represented by *KK*. *L* are several cracks or clefts in the Bone caused by the Pressure of the Knife, especially if it be not very sharp.

Besides the above-mentioned four sorts of Tubes running the length-ways of the Bone, I sometimes imagin'd I saw some in a contrary Situation, which seemed to proceed from the middle of the Bone, and terminate at the circumference; and that these were of two sizes, whereof the smaller were such as the above-mentioned least sort, that for the most part make up the length of the Bone. The Reason why I could not well discover these, was, from their being at a great distance from each other; and some seemed as if perforated by those that run the length-ways. And though I could not be certain I saw these radiated *Tubuli*, yet I do not question their being there; and I suppose the *Periosteum* is mostly constituted and nourished by these; the rather, since we see the same in Trees, whose Bark is formed by the transverse Fibres that run from the Center passing between the direct ones. And as we cannot determin the beginning of the Bark in the Tree, because it is annually formed anew out of all the Horizontal Vessels; so I conceive that the Membranes surrounding the Bones have their encrease from some Vessels proceeding from the cavity of the Bone to the circumference, where they are dilated into that thin soft Skin defending the Bone as the Bark does the Tree.

I know many believe the Origine and Nourishment of the Bark is from the Root; but if it were so, we should find the parts of the Bark near the Root larger, and ramify'd into smaller and smaller as they run higher, as

the

the Arteries and Nerves are, the further they go from the Heart and Brain ; whereas there is no difference between the Vessels of the Bark of the Root and Trunk : Besides, the Vessels of the Bark of several Trees, as the Birch, Cherry, Peach, &c. run not upwards as they do in the Ash, Oak, Elm, Nut, Apple, Pear, &c. but Circularly round the Superficies of the Tree. And all Bark whose Vessels run upwards, grows thicker as the Tree increases, the outside cracking grows Dead, and sticks to the young Bark underneath, which is the only living Part of the Bark. The contrary is evident in those Barks whose Vessels run round the Tree ; for as the Tree increases the Vessels not being able to Stretch nor Separate from each other, must necessarily break asunder ; so that the Old Bark is easily Separated and falls off from the New. Wherefore such Trees have always a very thin Bark, as is most evident in the Birch Tree.

And as we said of the Bark, that it is produced and nourisht from the Trunk of the Tree, so is it in the Production of the Skin of Animals, which is covered over with the Scarf-skin, consisting of Scaly Particles : For having examined the Skin of many Animals, it seemed to me to be formed by the wondrous interweaving of all the extremities of the Vessels that proceed to the extream parts of the Body ; from the ends of which, a certain matter issues forth forming the Scales ; the extremities terminating at those Scales which so long stick fast to the Vessels, till new ones displace them ; and once in the Skin of a very Fat Dog, I found a great number of Fat-globules between the branches of the Vessels that constitute the Skin.

These Observations brought me to Examine again the Scales that cover our Bodies, to find if it were possible whether they were not formed after the same manner as those of Fishes : and indeed each Scale of our Body is composed of a great company of Vessels, interwoven

together after the same manner as the Scales of Fish: Provident Nature as I have often found, performing her Operations usually after the same Method.

I therefore applied my utmost endeavours, in this Examination of the Scales of our Body, and judged those of the Mouth to be the fittest for that purpose, for that they not being dried are more easily separable from the Skin, and from each other: Examining these divers times, I still found a clear spot in the middle of them, standing up above the rest of the Scale (which I had observed before often, but thought it accidental) whence I concluded, that the Scales, not only of the Mouth but the whole Body, were composed as those of Fishes, of Vessels, proceeding to this clear Part, and nourishing the Scales which grow from thence.

Now as to the Transpiring Parts of our Bodies, I have formerly said the moisture was exhaled from the Vessels placed between the Scales; but now I find the number of the Vessels, far to exceed what I then thought, so that by the motion and heat of the Body, there may a very great quantity of sweat be expelled by so many Vessels; the number of which I endeavoured to Calculate, by laying some of the Scales of my Skin by some Sands, so to find their comparitive magnitude, and found the Axis of some larger Sands, 20 times, of others 15, and of others 10 times bigger than the Diameter of a Scale: These Scales are placed in a triple order upon one another: I took therefore the least of them and thus computed: 250 Scales as aforesaid are covered by one Sand, suppose then every Scale to consist of 500 Vessels, then will the moisture in the space of a Sand be thrust out at 125000 several little Pores, not reckoning the mouths of the Vessels between the Scales.

Examining the Scales of the Skin of my Arm I found a spot in the midst of some of them, but not so distinctly as in those of my Mouth.

I cannot well omit (in this place, relating to Transpiration) what some time since happened to me; which was an extraordinary itching on the upper part of my Nose, which viewing with an enlarging Looking-glass, I found a whitish scurfy speck which I took off, but not without some pain, it stuck so firmly to the Skin; observing it with my Microscope, I found the reason of its Scurfiness, and of its sticking so fast; for this bit of the skin constituted of Scales, was thick beset with little *Conical* Bodies, caused as I judged by a more than ordinary expulsion of a thick *Matter* or *Pus* in this place, which not being able to pass through the Scales, much less through the Vessels of the Scales, had made several pits or dents in the Skin, and forceably raised and torn off the Scales from the Skin, both which had caused the Itching and made the white scurfy speck, some part of the true skin being separated: and the little pain that I felt was caused by the fast sticking of the *Conical* Bodies to the Skin, which in separating were torn there-from; but what seemed strange to me, was that in a Days time, and sometimes sooner, a new scurfy Particle was formed like the former, beset with the same pointed parts, and this 6 or 8 times one after another, as fast as I took them off. I have given the Figure of this little bit of Skin, having never observed the like where I might well expect it, viz. in Leprous Persons, whose Disease is a scurfy separation of the Skin.

Fig. 8. is the bit of Skin of the true size by the naked Eye. *Fig. 9.* *A B C D* the same magnified, in which the Conical Bodies formed out of the Matter or *Pus* are observable. *E* a little hole in the *Cuticula*, through which a small hair grew. The under side of the little bit of the *Cuticula* which stuck to the true Skin is here represented.